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Routine Serologic Testing for Syphilis in a Community Medical Practice

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A retrospective review of 8,100 serologic tests for syphilis ordered during a 42-month period yielded positive rapid plasma reagin test results in 127 patients (1.6 percent) and a positive fluorescent treponemal antibody absorption reaction in 91 patients (1.1 percent). Of the 36 cases of biologic false-positive reactions, most were in prenatal patients. Forty-six cases of syphilis were previously undiagnosed but antibiotic therapy was given in only 26 of the patients. Some 24 percent of syphilitic patients were not treated because the positive serologic findings were overlooked. Cerebrospinal fluid determinations were analyzed and cost-effectiveness of finding a single case of previously undiagnosed syphilis was calculated. We found that routine serologic tests and cerebrospinal fluid studies for syphilis in asymptomatic patients had low rates of positivity in our community hospital and outpatient practice.

IN 1976 almost 43 million serologic tests for syphilis were done in the United States.[1] Previous studies have suggested that routine serologic tests for syphilis should be carried out more extensively in patients in hospital.[2,3] In some 6 percent of patients admitted to Buffalo General Hospital results were positive,[2] while in Grady Memorial Hospital, Atlanta, the figure was 9.5 percent.[3] The American College of Obstetricians and Gynecologists recommends that all gynecologic admissions include a routine serologic test for syphilis.[4] Most hospitals in the United States are community based.[5] Therefore, we retrospectively reviewed serologic testing for syphilis done over 42 months in a community hospital and outpatient practice.

Methods

We reviewed the results of tests for syphilis carried out from November 1974 through April 1978 in a group outpatient practice of 85 physicians and a community hospital with 150 adult medical and surgical beds. Serologic testing was initially done by the rapid plasma reagin (RPR) method. All positive RPR tests were referred to the Hawaii State Department of Health Laboratory for fluorescent treponemal antibody absorption (FTA-ABS) testing. Clinic and hospital records of patients with positive serologic findings were reviewed retrospectively to determine clinical characteristics and therapeutic outcome. Routine premarital serologic test results were excluded from analysis, because of insufficient clinical data and follow-up. To evaluate syphilis testing among individual patient groups, we also reviewed clinical records of all patients who had tests for syphilis done from January through April 1978, regardless of serologic test results. These patients' charts were evaluated for indications for ordering the tests and the rate of reactivity of each patient group (preoperative, gynecologic, and so forth). Cost-effectiveness was estimated by using a patient cost of $8.50 for an RPR test. Regardless of clinical history, a patient was considered to

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ABBREVIATIONS USED IN TEXT

BFP = biologic false-positive (reaction)
FTA-ABS = fluorescent treponemal antibody absorption
RPR = rapid plasma reagin

have syphilis if the RPR was positive and the FTA-ABS at least 1+ reactive. The serologic finding was considered to be a biologic false-positive (BFP) reaction if the RPR results were positive and the FTA-ABS negative. Also in five instances, patients with a weakly reactive FTA-ABS test were considered to have a BFP reaction, when clinical features were associated with certain underlying medical conditions.[6-9]

Results

During the 42-month study period, we reviewed results of tests for syphilis from 8,100 patients. Because many patients had preadmission tests done in the outpatient clinic, we could not accurately separate patients in hospital from those who remained outpatients. Of the 8,100 patients tested, 127 had a reactive RPR test (1.6 percent), with females comprising 54 percent of this group. Results of the FTA-ABS test indicated that 91 patients were reactive (1.1 percent of the total group). Among the 36 BFP cases, 19 were in prenatal patients; 7 were in the elderly, often among those with chronic medical conditions; 7 were in those with a collagen vascular disease, and the remainder occurred in patients for unexplained reasons. Of the 91 cases classified as syphilis, most were 2 to 4+ reactive, with only 10 patients having a 1+ reaction.

Therapeutic Outcome of Patients with a Serologic Diagnosis of Syphilis

Of the 91 patients with both positive RPR and FTA-ABS reactions, 45 patients (49 percent) had a previous history of syphilis, and of these, 35 patients (38 percent) had a history of treatment. In the latter group, 11 patients were considered to have received questionable therapy and were retreated during the study period.

The cases of the other 46 patients (51 percent of the positive cases) were previously undiagnosed. Only 26 (57 percent) of these patients received treatment. Nine patients did not receive treatment for syphilis because they had a terminal illness. For 11 patients, no reason for withholding antibiotic therapy could be determined from the records.

Of the 91 patients with syphilis, 32 underwent a lumbar puncture. Seven had elevated spinal fluid protein (range: 50 to 74 mg per dl). No spinal fluid specimen showed pleocytosis or was serologically reactive. Of the seven patients with abnormal spinal fluid protein, six had neurologic symptoms (86 percent). There was a statistically higher incidence of neurologic symptoms in patients with abnormal spinal fluid protein than in the group of 25 patients whose spinal fluid was normal (86 percent versus 32 percent; $P = .05$ by chi square analysis).

Estimated Cost and Physician Use of Serologic Testing for Syphilis

For the 42 months studied, the approximate cost of RPR serological testing was $8.50 multiplied by 8,100 patients, which equals $68,850. The cost of finding a positive case of syphilis was $68,850 divided by 91 patients, equaling $757. The cost of detecting a previously *undiagnosed* case of syphilis was $68,850 divided by 46 patients, equaling $1,497 per patient. These costs do not include the expense of the FTA-ABS tests done at the Hawaii State Department of Health Laboratories or the cost of physician services.

We reviewed the records of 830 patients who had serologic tests for syphilis ordered from January to April 1978. There were 17 patients with a positive RPR reaction (2.0 percent), and 14 patients with positive FTA-ABS test results (1.7 percent). Most of these serologic tests were ordered routinely; only 147 of the patients (18 percent) had testing done for specific indications, including neurologic symptoms, penile lesions, rash or vaginal discharge. The departments ordering the tests were as follows: medicine (477), obstetrics and gynecology (199), surgery (78), neurology (64) and dermatology (12). The rates of reactive RPR tests in these departments were as follows: medicine (1.9 percent), obstetrics and gynecology (1.0 percent), surgery (1.3 percent), neurology (6.2 percent) and dermatology (8.3 percent). The mean age of the neurologic patients with positive RPR tests was only slightly higher (48 years) than other types of patients (46 years). The reactivity rate of serologic tests ordered diagnostically was higher than for routine tests (5.4 percent versus 1.3 percent); 7 of the 17 reactive RPR tests occurred in patients with neurologic symptoms (peripheral neuropathy, optic neuropathy,

dizziness, tinnitus, vertigo, psychotic depression and transient ischemic attack).

Discussion

Our hospital and outpatient rates of positive RPR (1.6 percent) and FTA-ABS tests (1.1 percent) are considerably lower than those reported in other studies. At Grady Memorial Hospital, 9.5 percent of admitted patients had positive VDRL test results and 16.8 percent had positive findings on their FTA-ABS tests (including borderline reactions).[3] Tomecki and Plaut[2] reported that 6.2 percent of patients studied at Buffalo General Hospital had positive RPR and FTA-ABS tests. Raskind and Eisdorfer[10] in Seattle found reactivity rates of 6 percent for the VDRL (Venereal Disease Research Laboratories) test and 5.5 percent for the FTA-ABS test among elderly outpatients with dementia. Conversely, our BFP rate of 28 percent of all positive RPR tests was higher than the BFP rates found in the other studies (3 percent to 12 percent).[2,3,10] These differences in serologic reactivity of syphilis may be due to differences in patient population. Unfortunately, we are unable to compare racial status, age distribution, socioeconomic level, sexual behavior or underlying medical diseases of our patients with those of previous studies.

In this study, we attempted to estimate the cost of finding a previously undiagnosed case of syphilis. This was prompted by a report by Felman,[11] who estimated the cost of finding an early, undiagnosed case of the disease by routine premarital serologic testing in New York City to be approximately $15,000 in laboratory fees and $45,000 for physician charges. Our cost of $1,497 in laboratory fees was considerably lower because of Felman's low rate of detection of early undiagnosed syphilis (.03 percent in his population).

The clinical outcome of our patients with positive serologic findings was similar to that reported by Tomecki and Plaut.[2] In approximately half of our positive cases there had been a previous history of syphilis. Of the 46 newly diagnosed cases, 26 patients received treatment, 9 patients were not treated because of terminal illness and 11 patients (24 percent) were not treated for syphilis apparently because the positive serologic test result was overlooked. In Hawaii, private physicians, rather than the health department, have primary responsibility for patients with positive serologic findings for syphilis. We carefully examined the outpatient records of all patients with positive serologic results in our study and found that a significant percentage of these patients were lost to physician follow-up. We agree with Tomecki and Plaut[2] that there is often failure to pursue a serologic diagnosis of syphilis.

The value of examination of spinal fluid in asymptomatic patients with syphilis is controversial. The Center for Disease Control recommends spinal fluid examination for any patient with syphilis of longer than a year's duration.[12] Traviesa and co-workers[13] examined spinal fluid specimens of 30 asymptomatic patients with reactive serum FTA-ABS tests and a history of inadequate medical treatment. The only abnormal findings on examination of spinal fluid were in two patients with mildly elevated total protein. In our group of 32 spinal fluid examinations, seven patients had mildly elevated levels of total protein (highest was 74 mg per dl) with no pleocytosis and no positive spinal fluid VDRL test results. The abnormal findings in spinal fluid examinations occurred almost entirely in patients with neurologic symptomatology.

Conclusion

Whether hospitals should continue to screen for syphilis is dependent on the reactivity rate of their population, and the cost-benefit of such treatment. Certainly, however, any reactive serologic test result must be vigorously pursued, because a high percentage of these positive findings are either ignored or inadequately treated.

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